

WHAT IS CLAIMED IS:

1. A method for forming a homogeneous mixture of powder organic materials including at least one dopant component and one host component to form a pellet for use in thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device, comprising:

- a) combining organic materials in a powder form, such materials including at least one dopant component and one host component and placing the powder organic materials in a container;
- b) heating the container having the powder organic materials in a range of temperatures from 40 to 100°C for 30 to 100 minutes while purging the atmosphere in the container so that the atmosphere has a reduced pressure in a range from 10^{-1} to 10^{-3} Torr to remove moisture from the container atmosphere;
- c) filling the container with an inert atmosphere;
- d) mixing the powder organic materials in the inert atmosphere using a mixing mechanism to form a homogeneous mixture of powder organic materials; and
- e) compacting the homogenous mixture of powder organic materials to form a pellet suitable for thermal physical vaporization to produce an organic layer on a substrate for use in an organic light-emitting device.

2. The method of claim 1 wherein the mixing mechanism includes a propeller or a turbine blade.

3. The method of claim 1 wherein the amount of dopant component varies between 0.1 and 20% by weight of the total weight of the mixture.

4. The method of claim 1 wherein the inert atmosphere includes nitrogen gas, argon gas, or a mixture thereof.

5. The method of claim 1 wherein the homogeneous mixture of powder organic materials is compacted at a pressure in a range of 3,000 to 20,000 pounds per square inch.

6. The method of claim 1 further including storing the container before mixing in a reduced pressure atmosphere in a range from 10^{-1} to 10^{-3} Torr.

7. The method of claim 1 wherein mixing using the mixing mechanism includes rotating the mixing mechanism in a first periodic motion at a rate in a range of 20,000 to 50,000 revolutions per minute.

8. The method of claim 1 wherein mixing includes rotating the container in a second periodic motion at a rate in a range of 10 to 60 revolutions per minute.

9. The method of claim 1 wherein mixing using the mixing mechanism includes reciprocating the mixing mechanism in a third periodic motion at a rate in a range of 30 to 60 cycles per minute.

10. The method of claim 9 wherein the third periodic motion of the mixing mechanism includes traversing the length inside of the sealed container by means of a pneumatic cylinder and a traversing bracket.

11. The method of claim 8 wherein moving the mixing mechanism in a second periodic motion includes rotating or turning the container.

12. The method of claim 7 wherein the mixing mechanism is moved in a first periodic direction opposite the second periodic direction of the container.

13. The method of claim 7 wherein the mixing mechanism is moved in a first periodic direction corresponding to the second periodic direction of the container.

14. Apparatus for mixing powder organic materials, including at least one dopant component and one host component to provide a homogeneous mixture for use in forming a pellet for thermal physical vapor deposition to produce an organic layer on a substrate for use in an organic light-emitting device, comprising:

a) a container, containing a mixture of powder organic materials including at least one dopant component and one host component;

b) a mixing mechanism disposed in the container for mixing the mixture of powder organic material;

c) means for removing moisture from the container

d) means for providing an inert atmosphere into the container;

e) first periodic motion means for moving the mixing mechanism with a first periodic motion; and

f) second periodic motion means for moving the container with a second periodic motion to provide a homogenous mixture for use in forming a pellet for thermal physical vapor deposition producing an organic layer on a substrate for use in an organic light-emitting device.

15. The apparatus of claim 14 wherein the mixing mechanism includes a propeller or turbine blade.

16. The apparatus of claim 14 wherein the mixing mechanism includes a shaft connected to the propeller or turbine blade.

17. The apparatus of claim 14 wherein the first periodic motion means of moving the mixing mechanism includes a first rotatable shaft for rotating the mixing mechanism in a first periodic motion at a rate in a range of 20,000 to 50,000 revolutions per minute.

18. The apparatus of claim 14 wherein second periodic motion means of moving the container includes a second rotatable shaft coupled to the container for rotating the container in a second periodic motion at a rate in a range of 10 to 60 revolutions per minute

19. The apparatus of claim 14 further including reciprocating means for moving the mixing mechanism in a reciprocating motion at a rate in a range of 30 to 60 cycles per minute.

20. The apparatus of claim 19 wherein the reciprocating means includes a pneumatic cylinder and a traversing bracket.

21. The apparatus of claim 14 wherein the means for providing an inert atmosphere includes an intake pressure control device having a flow valve and a release valve.

22. The apparatus of claim 21 wherein the inert atmosphere includes nitrogen gas, argon gas or a mixture thereof.

23. The apparatus of claim 14 wherein the mixing mechanism is moved in a first periodic motion corresponding to the second periodic motion of the container.

24. The apparatus of claim 14 wherein the mixing mechanism is moved in a first periodic motion opposite to the second periodic motion of the container.

25. The apparatus of claim 14 wherein the means for removing moisture from the container includes an outtake pressure control device having a flow valve and a release valve.

26. The apparatus of claim 25 wherein the outtake pressure control device is connected to a vacuum pump.